

Integrating Brain Breaks and Multiple Intelligences to Support Health Literacy and Learning Outcomes

Author Information

Laura Bruno¹, Anne Farrell¹

¹Department of Kinesiology and Health Sciences, The College of New Jersey, Ewing, NJ USA.

Corresponding Author:

Laura Bruno

Email: brunol@tcnj.edu

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ABSTRACT

Purpose: This article examines the value of brain breaks and how integrating Howard Gardner’s theory of Multiple Intelligences can enhance student learning and engagement at all grade levels. Brain breaks, or micro-breaks, have been shown to boost focus, retention, and cognitive performance. Gardner’s theory, which suggests individuals possess different types of intelligence, supports a personalized learning approach. By aligning brain breaks with strategies that target diverse intelligences, health educators can create more dynamic, inclusive, and effective classrooms. The article offers practical strategies for incorporating Multiple Intelligences into brain break activities. **Conclusion:** Through a detailed examination of the connections between brain breaks and Multiple Intelligences, health education teachers will be able to better meet the diverse needs of student learners and may positively impact learning outcomes.

Keywords: brain breaks, multiple intelligences, teaching strategies, school health education, health literacy

1. INTRODUCTION

Education is a cornerstone of personal and societal growth, providing children with the knowledge, skills, and opportunities needed for future success (CDC, 2024). Within this broad educational experience, health education plays a vital role in supporting students’ physical, mental, and social development. Health education not only encourages healthy behaviors and physical activity but also fosters health literacy (HL)—an essential

competency that empowers students to make informed decisions and lead active, balanced lives (Vamos & McDermott, 2021). HL refers to the capacity to find, comprehend, evaluate, utilize, and promote health-related information and services to support or improve both personal health and the well-being of others (Society of Health and Physical Educators (SHAPE America), 2024a).

To positively impact the health education experience and HL outcomes, it is important to have a highly effective health education teacher. In accordance with the *Appropriate Practices in School-Based Health Education* guidance document (SHAPE America, 2024b), the following are appropriate practices: the health educator plays a vital role in creating a supportive and inclusive classroom where students feel safe and are given meaningful opportunities to succeed. Instruction should align with both state guidelines and the National Health Education Standards, ensuring consistency and quality across learning outcomes. Lessons must be thoughtfully designed and delivered to foster the development of students' health literacy and promote behaviors that support long-term well-being. To help students connect with and internalize the content, learning experiences should be personally relevant and engaging. In meeting the diverse needs of all learners, educators are encouraged to use a variety of instructional methods and maintain active student participation. Teaching strategies should be well-balanced, drawing from multiple approaches, with real-time adjustments made as needed to enhance understanding, sustain energy, and keep students focused throughout the lesson (SHAPE America, 2024b).

Focusing on the need for educators to use a variety of instructional methods, first requires the exploration of pedagogical foundations. Past educational theories often equated heavy academic workloads or engagement time with higher achievement, based on the belief that more time spent on tasks would naturally lead to better learning outcomes. However, this assumption has been increasingly challenged, as research highlights the cognitive and emotional strain such an approach places on students and emphasizes the need for personal connection and motivation (Martin & Bolliger, 2018; Meyer, 2014; Mazzoli et al., 2021; Schaeffer, 2022; Terada, 2022).

Effective learning and improved academic performance are now recognized as outcomes of both engaging academic experiences and repeated exposure to content through varied methods. This combination reinforces the neural pathways supporting the development of essential skills and long-term knowledge retention (Martin & Bolliger, 2018; Meyer, 2014; Terada, 2022). Despite this shift in understanding, the traditional approach remains common in many K–12 classrooms, where students often face

demanding workloads that extend beyond school hours through additional homework, contributing to stress, fatigue, and disengagement.

This excessive approach, whether through prolonged lectures, extensive homework, or both—can overwhelm students, leading to mental fatigue, decreased motivation, lower academic performance, and negative impacts on mental health (Albulescu et al., 2022). This has been termed a 'human energy crisis' that impedes intellectual capacity and energy renewal. In a system that promotes a perpetual *always-on* mentality, it is crucial to strike a balance between work efficiency and maintaining optimal well-being (Guo et al., 2024). In such cases, it is crucial to find ways to make educational activities more effective and manageable. Equally important is understanding the balance between academically engaged time and non-engaged downtime, as well as the types of activities used during both, to support and enhance student success. When thinking about this balance, SHAPE America's *Appropriate Practices in School-Based Health Education* guidance document (2024b) encourages health educators to evaluate their current methods and consider integrating new practices. The suggestion presented in this article outlines how brain breaks and multiple intelligences are promising options.

2. Brain Breaks

Brain breaks, or micro-breaks, have been defined as short discontinuities of current tasks lasting no longer than a few minutes (Albulescu et al., 2022) and have been successfully used in both the academic and professional environments. Adding breaks into a lesson was often seen as a cooling-off period or way to re-energize prior to returning to the critical work and learning phases; however, researchers clarified this misconception when reporting that brain breaks are not a cooling-off period, rather a time of intense brain activity (Buch et al., 2021; Terada, 2022). On the contrary, instead of resting, the brain rapidly replays practice/learning sessions, cycling through the material at incredible speeds. During this process, information moves from the neocortex, which handles sensory and motor processing, to the hippocampus, the center for memory, many times over a few seconds. In simpler terms, after learning a new skill or concept, the brain remains active during non-engaged "downtime". During this period, it unconsciously replays the skill or content dozens of times in just a few seconds.

Pleasantly surprising, stepping back from the activity does not mean disengaging from it at all. According to Buch et al. (2021), learning a new skill or concept involves a process called "binding," where the brain connects new information to existing memories. By linking new content with personal

memories and experiences, the brain actively engages in binding. After this active learning phase, the brain stays active during rest or downtime, using this period as a virtual workspace to process and integrate new information. This neural replay—where the brain rapidly cycles through recent experiences—is a key mechanism for solidifying knowledge and enhancing learning, making future recall and application easier and more effective (Buch et al., 2021). Therefore, it is important to recognize the value of breaks in the learning process, as brain breaks play an equally significant role in the learning process as a whole.

2.1 Length and Time of Brain Breaks

If the active phase or engaged *on-task* portion of learning is supported by brain breaks, it is important to determine when breaks, or non-engaged *downtime* may be most beneficial. There are two major considerations that help determine when to use brain breaks: a person's age and the time of day (Cline et al., 2021; Peiris et al., 2022; Schaeffer, 2022; Willis, 2016). Brain breaks should be used proactively- before signs of fatigue, boredom, distraction, or inattention set in. This notion is supported by SHAPE America's (2024b) *Appropriate Practices in School-Based Health Education* where the health teacher adjusts instruction to meet the unique needs of all student learners. This strategy helps prevent cognitive overload that can result from extended periods of instruction. The optimal frequency of brain breaks largely depends on a student's chronological age, as it directly influences their capacity to focus and stay engaged. Generally, primary grade students benefit from focused *on-task* sessions of 10 to 15 minutes, while middle and high school students can handle 20 to 30 minutes. Learning time for adults can be extended to 40 minutes. Following periods of concentrated effort, a short break of three to five minutes is recommended. However, even brief pauses of just one to two minutes have been shown to offer noticeable benefits (Morin, 2022). While these are general guidelines, research suggests that a 10 x 3 mini-lesson format is more effective than a traditional 30-minute continuous lesson. Limiting new content delivery or skill practice to 10-minute segments, followed by a 3-minute brain break has been shown to enhance skill development and support better cognitive learning and retention (Cline et al., 2021; Peiris et al., 2022; Schaeffer, 2022; Terada, 2021; *The Science Behind Brain Breaks*, 2020; Willis, 2016).

The concept of mini-lessons with a reduced lecture-to-break ratio is especially important when considering the time of day. Research shows that academic performance on both standardized and normative assessments tend to decline as the school day progresses, highlighting the need for more strategic, brain-friendly scheduling (Peiris et al., 2022; Schaeffer, 2022; Sievertsen et al., 2016; Willis, 2016). This cognitive fatigue is a major

concern as students' mental energy steadily depletes, resulting in an increased likelihood of underperformance on tests. In fact, late-day cognitive fatigue has been estimated to be equivalent to losing 10 full school days of learning (Terada, 2021). However, if breaks were incorporated more frequently as the school day progressed, improvements have been noted in test scores, overall engagement, and cognitive energy (Peiris et al., 2022; Schaeffer, 2022; Sievertsen et al., 2016). Most importantly, it is necessary for educators to know their students and recognize signs presented by the students to indicate breaks are needed (SHAPE America, 2024b). Even before the planned instruction time is up, if students show noticeable signs of fatigue, boredom, distraction, or inattention, breaks should be introduced immediately (Morin, 2022).

2.2 Categories of Brain Breaks

Brain breaks come in various types, and the kind of break used can significantly impact their effectiveness (Edutopia, 2023). It is important to emphasize that brain breaks should avoid subject-related content and remain as unstructured as possible, since less structure has been linked to better learning outcomes (*The Mysterious Power of Brain Breaks*, n.d.). The types of brain breaks include: classroom-friendly, movement-based, or green breaks. Classroom-friendly breaks may include activities like crafts, drawing, or puzzles. Movement-based breaks may incorporate stretching, running, jumping, free dance, free movement exploration, or other physical opportunities. While green breaks are activities that are completed outdoors, with the goal of engaging in natural spaces when possible. Green activities may include a short walk, being outside observing trees or plants, outdoor playground activities that are surrounded by greenery, tending to a school garden or classroom plant (*The Science behind Brain Breaks*, 2020). These categories can engage any of the eight multiple intelligences as illustrated in Figure 2.

It is important to note that classroom and movement-based brain breaks can overlap with eco-friendly activities, which may enhance their effectiveness. When examined individually, green breaks—those lasting 10 minutes or more—have been shown in some studies to improve test performance, attention levels, and overall working memory more effectively than other types of breaks (Amicone et al., 2018; Koepp et al., 2022). However, if extended time is not available, students who engage in movement based free time, return back to the learning environment most ready to engage and learn (Albulescu et al., 2022; LSA Learning & Teaching Technology Consultants, 2021; Schaeffer, 2022). While still beneficial, classroom-friendly activities ranked lowest for learning and engagement. This is likely because they demand more self-regulation from students,

which requires greater mental effort (Edutopia, 2023; *The Science behind Brain Breaks*, 2020).

2.3 The Who and Why Behind Effective Brain Breaks

The *who* and *why* are two additional factors to consider when selecting brain breaks for students. When thinking about the *who*, teachers should decide whether the brain break is best done individually (such as deep breathing or puzzle work), in small groups, as a whole class (like tag games or Simon says), or through a combination of individual and group activities (Albulescu et al., 2022; Morin, 2022). Offering a variety of options helps reduce stress and discomfort for students who struggle with group activities.

Regarding the *why*, it is essential to choose breaks that address and support the student's current mental state (Morin, 2022). For example, if students appear tired or lethargic, it may be better to replace a planned box-breathing meditation with a more energizing activity—such as a fitness challenge, a game of charades/Pictionary, or a brisk outdoor walk—to help them re-engage for the next learning phase. Given these factors, ideally teachers have a variety of brain break options on hand that both match the current classroom atmosphere and anticipate students' needs and interests. To further support individual learning strengths, needs and outcomes, teachers may reimagine multiple intelligence as brain breaks as a means to enhance academic performance in health education and improve health literacy. The Theory of Multiple Intelligences will first be presented, followed by an exploration of how health educators may consider integrating the theory of MI into the practice of brain breaks to support learning.

3. Multiple Intelligences

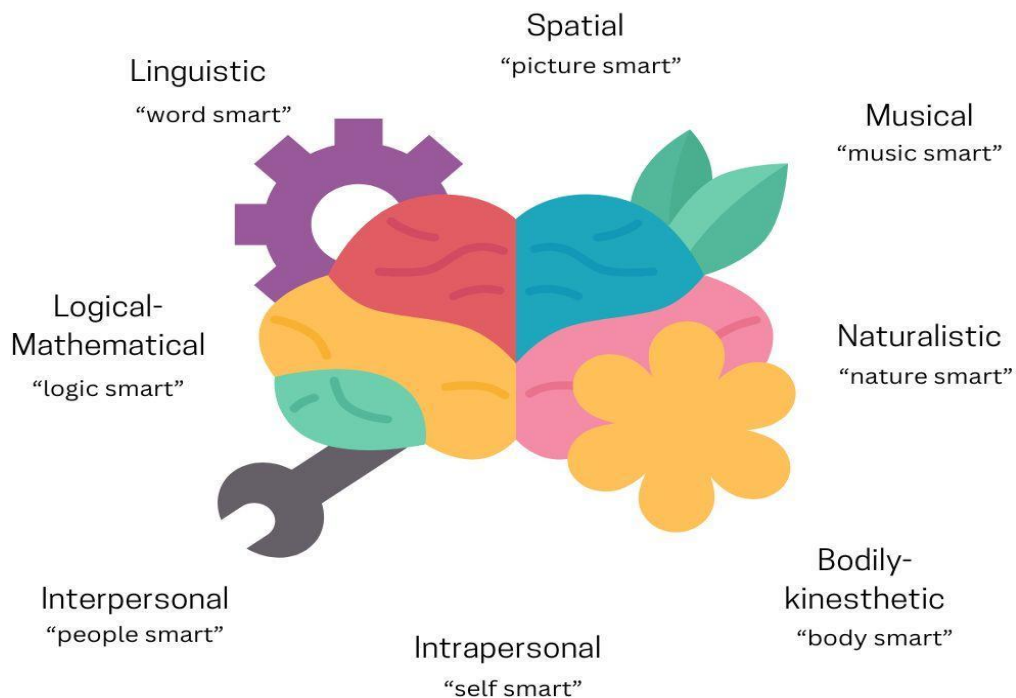
Incorporating Howard Gardner's Theory of Multiple Intelligences (MI) into brain breaks presents a dynamic approach to invigorate students' minds and foster greater engagement. As discussed above, traditional brain breaks typically involve physical movement or relaxation techniques to reset attention but repurposing them through the lens of multiple intelligences can cater to the diverse learning strengths of students. Gardner's theory of MI is widely acknowledged, grounded in research and most educators are somewhat familiar with the benefits and applications of his work (Gardner, n.d.).

Prior to the development of this theory, a traditional test, historically an intelligence quotient (IQ test) was used to measure intelligence level. This way of thinking (traditional intelligence, or IQ) conceptualizes intelligence as one-dimensional (a score or quotient). As such, this thinking mainly boasts a high environmental influence, strong linguistic and logical-

mathematical domains, and/or suggests genetics or inheritance. Gardner challenged this notion and identified eight types, or domains, of intelligences. These include: linguistic (word smart), logical-mathematical (logic smart), spatial (picture smart), musical (music smart), bodily-kinesthetic (body/movement smart), interpersonal (people smart), intrapersonal (self-smart) and naturalistic (nature smart). Figure 1 provides a brief overview of each domain. MI theory suggests that each of these intelligences are present, in some capacity, in all individuals, noting that some domains may be more developed than others; however, strength in one area does not necessarily imply the same level of ability in another domain. MI theory views intelligence as a spectrum, where individual 'potential' can be cultivated through various experiences.

Figure 1

Howard Gardner's Eight Multiple Intelligences



Note: The inset represents a visual of Howard Gardner's eight multiple intelligences and their associated meanings.

3.1 Multiple Intelligence-Enriched Brain Breaks

In the world of education, the theory of MI plays an important role, as educators should recognize that just as each student is unique, so is their learning strength, intelligence and interest (Austin, 2016; Setyawan et al., 2024). With the awareness of MI-theory comes the ability to offer learning opportunities in various ways. By understanding the different intelligences and incorporating learning opportunities that purposefully engage MI in one's classroom, health educators can enhance their curriculum delivery which will lead to greater outcomes for students (personal enjoyment, cognitive development, levels of engagement and overall growth/improvement). To enrich learning in the classroom, teachers can target individual intelligence, learning strengths, and personal interests by rethinking how they use traditional brain breaks.



In context, linguistic learners could engage in activities like storytelling, quick writing prompts, or word association games. These types of brain breaks stimulate verbal-linguistic intelligence by allowing students to express themselves through language. Similarly, bodily-kinesthetic learners might enjoy a quick burst of physical activity, such as a short dance routine or a stretching sequence, which engages both their body and brain to enhance focus when returning to tasks. This helps students utilize a personal need for movement while also refreshing cognitive processes. Additionally, students with logical-mathematical intelligence might benefit from puzzles, numbricks, riddles, or brain teasers that require critical thinking and problem-solving, keeping their minds sharp without the pressure of formal work. Meanwhile, students with interpersonal intelligence could take part in collaborative activities, such as short group discussions, sharing fun facts, or working together on a challenge. These activities serve as non-engaged downtime that supports cognitive processing. To further optimize brain breaks for all students, intrapersonal learners could be encouraged to take a few minutes for quiet reflection in their journal, or engage in mindfulness exercises, offering them the space to recharge mentally and emotionally. Visual-spatial learners might appreciate activities such as engaging in visual memory exercises or solving spatial-visual puzzles that stimulate their creativity and spatial reasoning skills.



By rethinking traditional brain breaks to target these various intelligences, educators can create a more inclusive classroom environment where each student's strengths are not only acknowledged, but more importantly, embraced and enhanced through these binding activities (Reyes-Amigo et al., 2025). This approach ensures that brain breaks not only refresh students but also help cultivate a deeper connection to their learning styles, as students are typically drawn to activities that align with

their unique intelligence(s) (Setyawan et al., 2024). This autonomy encourages deeper intrinsic motivation and more rapid student engagement (Beachboard, 2020). For this reason, it is critical that educators have a variety of sample brain break activities that fall across the MI-spectrum (Setyawan et al., 2024). Educators and students alike are encouraged to utilize a free online MI- self assessment tool to determine their unique intelligence. This may then help the instructor create and provide appropriate brain break MI-based activities specific to class needs. Figure 2 provides sample brain break activities that relate to each of the multiple intelligences.



Figure 2

Sample Brain Break Challenges that incorporate various Multiple Intelligences

Multiple Intelligence Challenges		
Verbal Linguistic		
<u>Rebus Puzzle</u>	<u>Boggle</u>	<u>Tongue Twisters</u>
 <i>Answer- Top Secret</i>		<p>Peter Piper picked a peck of pickled poppers.</p> <p>Silly Sully swiftly slides down the slippery slope.</p>
Visual-Spatial		
<u>I-Spy</u>	<u>Left/Right Brain Challenge</u>	<u>Optical Illusions</u>



<p>Pizza I Spy</p> 	<p>Look at the words below, SAY the color <u>NOT</u> the word.</p> <p>YELLOW BLUE ORANGE BLACK RED GREEN PURPLE YELLOW RED ORANGE GREEN BLACK BLUE RED PURPLE GREEN BLUE ORANGE</p>	<p>Who do you see? Old or young woman?</p> 
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Musical



<u>Create</u>	<u>Name that Tune</u>	<u>Rhythm-Clapping Game</u>
<p>Create a rap/jingle using 5 of 10 words below in under 2min.</p> <p><i>Hot shot Surprise</i> <i>Moving Rooster</i> <i>School Pretty</i> <i>Friend Chocolate</i> <i>Sting Pencil</i></p>	 <p>Option 1: With a partner, select a tune to hum a song and see if your partner can guess the title or finish the tune.</p> <p>Option 2: Play a brief snippet of a hit song for select beats (or seconds) and challenge students to guess the title.</p>	<p>Have students sit across from a partner OR individually clap (tap) to the beat of a song.</p> 

Naturalistic

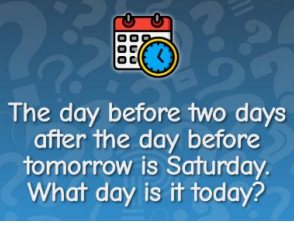
<u>Survival Game</u>	<u>Nature I-Spy</u>	<u>This or That - Nature</u>
<p>Students list items of importance in a survival situation. Examples include:</p> <ol style="list-style-type: none"> 1. A compass 2. A shaving mirror 	<p>In outdoor space, provide a list of items for students to seek while being outdoors in nature</p> <ul style="list-style-type: none"> • <i>Squirrel</i> • <i>Yellow Flower</i> • <i>Leaf</i> 	<p>Camping Trip : Provide plausible scenarios that present possible dangers one might encounter when camping and allow students to select an 'either or' situation. Vary the level of</p>

<p>3. A quantity of mosquito netting 4. A 5 gallon can of water 5. A case of army food rations 6. Maps of the Pacific Ocean 7. A floating seat cushion 8. A small transistor radio 9. 15ft nylon rope 10. 2 boxes of chocolate bars 11. A fishing kit 12. A four man rubber life craft. (Crystal Spring Foundation)</p>	<ul style="list-style-type: none"> • Bird • Nimbus Cloud • Pinecone • Orange item • Grass • Insects • Snakeskin • Nut • Feathers • Nest • Rock 	<p>difficulty as appropriate. You see this snake</p>  <p>Do you do: approach it or run</p> <p style="text-align: center;">OR</p> <p>You are hungry and come across the following berries:</p>  <p>Can you identify if they are: Safe to eat or Unsafe to eat</p>
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Bodily-Kinesthetic

<u>Dance Break</u>	<u>Rubber Band Brain</u>	<u>Would You Rather?</u>
<p>Use a popular tune and allow a brief period for 'free dance'</p> 	<p>Rubber-band Exercise Using a large rubber band, students contract and relax the band while keeping the beat/tempo of a song.</p> 	<p>Let's Move: Students select an activity/ movement based on their personal preference.</p> <p>Would you rather visit the beach or the mountains? Beach = standing squats Mountains = lunges</p>

Logical-Mathematical

<u>Numbrix</u>	<u>Riddle</u>	<u>Brainteaser</u>
<p>Fill in numbers from 1-81 in numerical order. Start in any open square, adding numbers either horizontally or vertically, changing direction as needed</p>	 <p>The day before two days after the day before tomorrow is Saturday. What day is it today?</p> <p style="text-align: center;">OR</p>	<p>Figure out the next number in the sequence:</p>



Draw the next figure in the sequence



24?8
3?912
48?16
51015?

Interpersonal

Charades

Cooperative Game/Activity

Board/Card Game

Provide various phrases or actions and have students act out while teammates try to guess.



Emotion & Movement Match - Standing back to back, partners jump to face each other, either matching emotions (happy, sad, excited, etc) or arm formations (crossed, extended, pointing, etc.)

Birthday Lineup - Standing side by side, group members reposition themselves (without talking) to be in birthday (month, day, year) order.

Blind Draw - A team member instructs other "artists" to draw an item. Describing a chosen item or picture without revealing what it is. Compare instructor and artist creations.

Group Juggle - The group stands in a circle facing inward and tosses balls amongst the group in a specific order. Adding additional balls as needed.

Two Truths & a Lie- a student shares three statements about themselves, two of which are true and one is a lie. Other group members must guess which is the lie

In small groups, play a board game and/or card game of choice.






Intrapersonal

Journal

Meditation/Mindfulness

Independent Reading

<p>Provide time and space for journaling thoughts and feelings.</p> 	<p>Integrate periods of self-reflection and/or mindfulness to self-understand</p> 	<p>Allow students to get comfy in various classroom spaces and read independently.</p> 
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Note: The figure above outlines how a health educator might provide students with brain break options that are supported by their unique multiple intelligences.

Image sources available upon request.

4. CONCLUSIONS

Brain breaks and the theory of Multiple Intelligences have long been recognized as valuable tools for enhancing the learning experience. Brain breaks—short, purposeful pauses in academic activities—help students reset attention, recharge cognitive faculties, and increase overall learning. These breaks are not merely time fillers; they are purposeful moments designed to engage students in activities that enhance content application and retention (binding). Additionally, these activities refresh and refocus cognitive engagement, allowing for a smooth return to learning tasks with renewed energy. Similarly, Howard Gardner’s theory of Multiple Intelligences recognizes that students possess diverse strengths, ranging from linguistic and logical-mathematical to bodily-kinesthetic and interpersonal intelligences. By reimagining Multiple Intelligence activities as brain breaks, educators are positioned to create meaningful and intentional non-engaged *down time* activities that not only appeal to individual student interests and strengths but ultimately may lead to greater learning outcomes and improved health literacy. Lastly, based on SHAPE America’s *Appropriate Practices in School-Based Health Education* (2024b), the ideas presented in this article encourage health educators to explore this instructional method as an appropriate practice to increase active student participation, enhance understanding, sustain energy, and maintain focus.

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5.2 Conflict of Interest

The authors declare no conflicts of interest.

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